Science Olympiad Invitational

Jan 21,2017

Disease Detectives Test

Total points: 80

Answer all questions.
Questions 73-80 will be used as tie breakers, in case of ties.

Team #: _____ **Color: _____**

School: _____

Match the epidemiology terms 1-11 on the left with the letter(from A-M) of the correct definition from right. Write the answers in the second column.

1.Agent		**A**. Animate intermediary that that carries an agent from a reservoir to a susceptible host
2.Carrier		**B**. Disease capable of being transmitted from one person to another by contact or close proximity
3.Fomite		**C**. Disease, chronic condition, or type of injury is constantly present in a given geographic area or population group
4.Distribution		**D.** Factor that is essential for a disease, chronic conditions, or injury to occur
5.Endemic		**E**. Frequency and pattern of health-related characteristics and events in a population
6.Contagious		**F**. Habitat in which an infectious agent normally lives, grows, and multiplies
7.Vector		**G**. Inanimate object capable of carrying infectious agents and transferring them from one person to another
8.Host		**H**. Infectious disease that is transmitted from animals to humans
9.Incidence		**I.** Measure of severity of a disease,expressed as the proportion of people with the disease who become extremely ill or die
10. Reservoir		**J.** Most direct route by which a disease is transmitted
11.Zoonosis		**K**. Person or animal who harbors the infectious agent for a disease and can transmit it to others, but does not show signs of the disease
		L. Person or other living organism that is susceptible to an infectious agent under natural conditions
		M. Rate that measures the frequency with which a health problem, such as a new injury or case of illness, occurs in a population

What is the first step in an outbreak investigation?

12._____

The epidemiological triad includes what three elements?

13. _____

14. _____

15. _____

Name three components of chain of transmission triad infectious agents

16. _____

17. _____

18. _____

Concisely list the six elements of the Chain of Infection.

19. _____

20._____

21._____

22. _____

23._____

24._____

Who is the Father of Modern Epidemiology?

25. **_____**

What are the four components of a case definition?

26. _____

27. _____

28. _____

29. _____

What is required for both a cohort and a case-control study?

30. _____

31. Calculate the odds ratio for the following table. And circle the correct option given below.

	Positive	Negative	Total
Positive	72	115	187
Negative	5	122	127
Total	77	237	314

A. 15.3
B. 14.4
C. 9.8
D. 18.7

Use the following scenario to answer question 32
Birmingham has a population of 200 people. Before a party, only one person was infected withE.Coli. After the party, another 50 had fallen ill. The E.Coli victim and one other family member were not in attendance at the party, which was later investigated as an outbreak of E.Coli.

32. **What was the attack rate for the outbreak?**

A. 1/200
B. 51/200
C. 50/200
D. 50/198

33. In a cohort study, the relative risk for drinking apple cider is 4.9. Which interpretation is correct?

A. Apple cider is the cause of the outbreak.
B. People who drank apple cider were almost 5 times more likely to become ill than those who did not.
C. Apple cider is protective.
D. The association between apple cider and illness is statistically significant

34. **Which of the following would be reasonable to include in the final report from a foodborne outbreak investigation?**

A. Notes from interviews with food workers at implicated establishment
B. Individual laboratory reports
C. Summary of findings from case-control or cohort studies
D. Names of patients

Use the information from the following case to answer questions 35 - 39

A total of 19 people infected with the outbreak strain of Shiga toxin-producing STEC O157:H7 were reported from seven states. The majority of illnesses were reported from the western United States. The number of ill people reported from each state was as follows: California (1), Colorado (4), Missouri (1), Montana (6), Utah (5), Virginia (1), and Washington (1).

Among people for whom information was available, illnesses started on dates ranging from October 6, 2015 to November 3, 2015. Ill people ranged in age from 5 years to 84, with a median age of 18. Fifty-seven percent of ill people were female. Five (29%) people were hospitalized, and two people developed hemolytic uremic syndrome, a type of kidney failure. No deaths were reported.

State and local public health officials interviewed ill people to obtain information about foods they might have eaten and other exposures in the week before their illness started. Fourteen (88%) of 16 people purchased or ate rotisserie chicken salad from Costco. Costco helped with public health officials during the investigation by providing records and information related to ingredient suppliers to try to determine the source of the outbreak.

The Montana Public Health Laboratory tested a sample of celery and onion diced blend produced by Taylor Farms Pacific, Inc. and collected from a Costco store in Montana.

Preliminary results indicated the presence of *E. coli* O157:H7. This product was used to make the Costco rotisserie chicken salad eaten by ill people in this outbreak. According to the

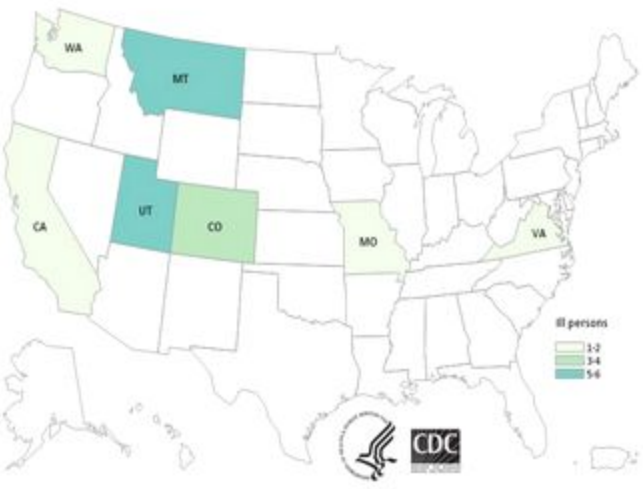
FDA, further laboratory analysis was unable to confirm the presence of *E. coli* O157:H7 in the sample of celery and onion diced blend. Both companies recalled the products voluntarily.

- People usually get sick from Shiga toxin-producing *E. coli* (STEC) 2-8 days (average of 3-4 days) after swallowing the germ.
    - Most people infected with STEC develop diarrhea (often bloody) and abdominal cramps.
    - Most people recover within a week.
    - Some illnesses last longer and can be more severe, resulting in a type of kidney failure called hemolytic uremic syndrome (HUS). HUS can occur in people of any age but is most common in young children under 5 years, older adults, and people with weakened immune systems. Symptoms of HUS can include fever, abdominal pain, pale skin tone, fatigue and irritability, small, unexplained bruises or bleeding from the nose and mouth, and decreased urination.
    - People who experience these symptoms should seek emergency medical care immediately.

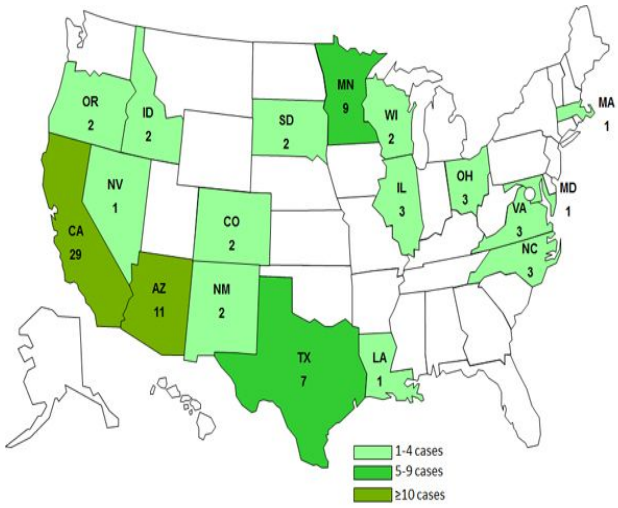
- STEC infection is usually diagnosed by testing a stool sample

35. **Which case count map best represents this case from Costco**? _____

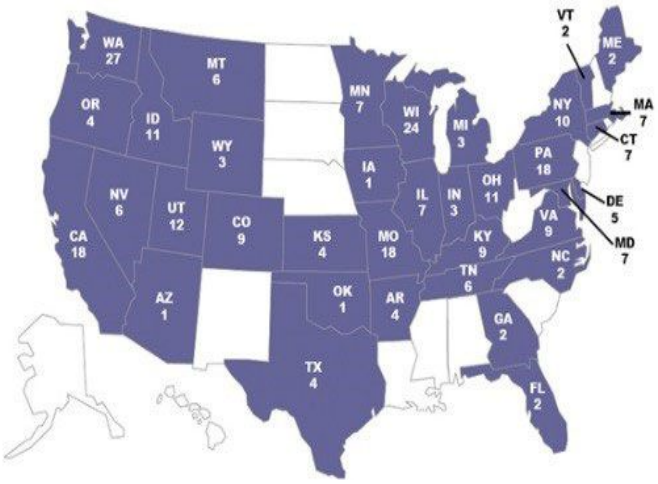
A.



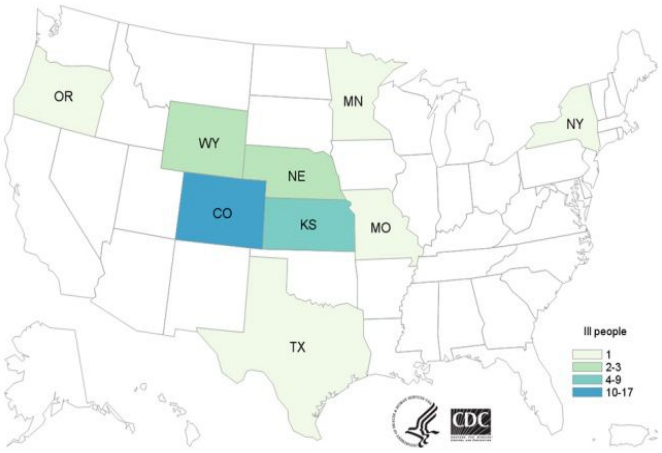
C.



B.



D.



36. When did the outbreak start? _____

37. What was the peak case amount of the outbreak? _____

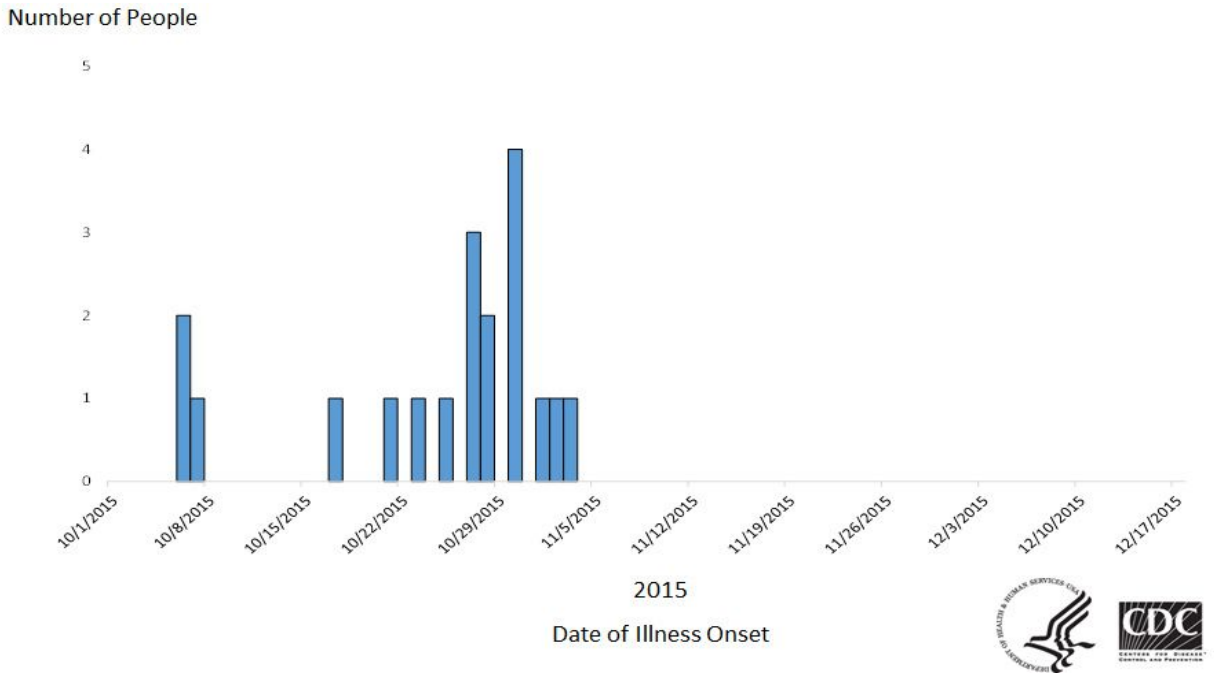
38. **Which food item from Costco was linked to the cause of outbreak?**

_____

39. **What steps are taken to avoid further outbreak**?

_____

Using graph below answer questions 40 - 44



*n=19 for whom information was reported as of December 17, 2015.

40. **What type of graph is this**? _____

41. **What does the x-axis represent**? _____

42. **What does the y-axis represent**? _____

43. **From the graph, in which month did the last case occur?**_____

State True or False

44. The above graph shows continuous source outbreak. _____

List Three uses of Epi Curve

45._____

46. _____

47. _____

For questions 48 through 56 answer True(T) or False(F).

48.To avoid the risk of foodborne illness, chicken and ground beef cooked to a higher temperature than fish or roasts.

49.Bacteria cannot grow in frozen food

50. Information collected by each investigator on an outbreak investigation team is only useful to that investigator.

51. Food borne diseases can be caused by harmful toxins or chemicals that have contaminated the food.

52. Most food related illnesses can be associated with a variety of causative agents.

53. Some foodborne pathogens can also be spread by water, from person-to-person, and from animal-to-person.

54. People with ***vibriosis*** become infected by consuming raw or undercooked seafood or exposing a wound to seawater.

55. The most common sign and symptom of a food borne disease is cough and weight gain.

56. Tasting food to check if it is good can prevent from food poisoning.

The below table has information from 3 different persons who were reported to investigators. Based only on the information in the table, indicate which would be a confirmed case (CC), which would be a probable case (PC) and which would not be considered a case (NC).

Case Description	Case category
57. A 25 year-old women who reported having severe diarrhea along with nausea and vomiting that started on November 23. No stool culture was done. She reported participating in a banquet.	
58. A 46 year-old factory worker who reported having a fever, cramping and nausea that started on October 9. He had a stool culture negative for Salmonella and reported eating at a restaurant.	
59. A 30 year-old contractor who participated in a wedding reception and reported gastrointestinal illness including diarrhea and vomiting and had a stool culture positive for Shigella.	

List the steps epidemiologists have to follow after they have established the *existence of an outbreak* investigation

60._____

61._____

62._____

63. _____

64._____

65._____

66._____

67._____

In the table below write the modes of transmission and an example of the mode.

Mode of Transmission	**Example of the mode**
68.	
69	
70.	
71.	
72	

Write the correct term for the following definition.

73. An instance of a particular disease. _____

74.The direct transmission of an infectious agent by means of the aerosols produced in sneezing, coughing, or talking. _____

75.The study of the distribution and determinants of health conditions or events in populations, and the application of this study to control health problems.
_____

76.The probability that an individual will be affected by, or die from, an illness or injury within a stated time or age span. _____

77. The occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season. _____

78. The systematic, ongoing collection, analysis, interpretation, and dissemination of health data. _____

79. An aggregation of cases of a disease or other health condition that are closely grouped in time and place. _____

80. A group whose members have had contact with a cause of, or possess a characteristic that is a determinant of, a particular health problem.
_____

*******End Of Test*******